dLAN® Wireless extender

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Preface

Thank you!

With the dLAN® Wireless extender, you have purchased a HomePlug adapter that combines the advantages of the dLAN® and WLAN network standards in a single device. The dLAN® Wireless extender also features a LAN port with which you can connect a PC directly to the adapter. With transfer rates of up to 85 Mbps via dLAN® and up to 54 Mbps via WLAN, this convenient adapter lets you access the Internet in any room of your house – and thick concrete walls are no longer a barrier to wireless surfing!

Exacting manufacturing standards and stringent quality control are the basis for our high product standards to ensure your fullest satisfaction with your devolo® dLAN® Wireless extender. They are the preconditions for the consistent, outstanding quality of our products.

You can also rely on devolo® for service and support after purchasing one of our products. For example, our website not only contains extensive documentation, but also software and firmware updates. Be sure to visit www.devolo.com regularly.

And if you are satisfied with your dLAN® Wireless extender, be sure to have a closer look at our other products which are also designed to make your connected lifestyle easier and simpler!

About this manual

After a brief introduction to dLAN® and WLAN basics in Chapter 1, Chapter 2 will cover successfully setting up your dLAN® Wireless extender. Chapter 3 provides detailed information on the options of the integrated configuration interface. For instructions on connecting your Wireless extender to the dLAN® and using WLAN access, see Chapters 4 and 5. For

technical specifications, declarations of conformity and our warranty terms, see Chapter 6 at the end of this manual.

A number of places in this manual are highlighted with special icons:

Important note: you definitely should make a note of these recommendations.

Interesting information: additional tips and background info on the configuration of the dLAN® Wireless extender.

From time to time you will find the icon of a devolo® program in the margin to the left of the text; the program will be explained in greater detail at that point.

We hope you have just as much fun reading this manual as we had writing it. If you have any further ideas or suggestions related to our products, we would be delighted to hear from your at support@devolo.com!

devolo® on the Internet

For detailed information on our products, please visit www.devolo.com. The download area not only contains product descriptions and documentation, but also updates of devolo® software and your device's firmware.

We especially recommend the extensive devolo® manuals on the topic of home networking that contain a wealth of interesting background information. The devolo® manuals are available free of charge and can be downloaded from the Service & Support area of our website.

Package contents

Please take a moment to ensure that the contents of the package are complete before starting with the installation of your dLAN® Wireless extender. You should have the following items:

dLAN® Wireless extender adapter,

Printed information leaflet,

CD-ROM with

- devolo® software,
- product manual,
- additional documentation.

Contents

Preface 3
Thank you! 3
About this manual 3
devolo® on the Internet 4
Package contents 5

1 Introduction 8
1.1 What exactly is dLAN®? 8
1.2 What is WLAN? 8
1.3 What the dLAN® Wireless extender has to offer 9
1.4 Sample applications 10
1.4.1 dLAN® Wireless extender as an access point 10
1.4.2 dLAN® Wireless extender as a client 11

2 Initial use 13
2.1 Displays and connections 13
2.1.1 LEDs 13
2.1.2 Ports 14
2.2 Connecting the dLAN® Wireless extender 14
2.3 Software installation 15
2.3.1 Software for Windows® 15
2.3.2 Software for Mac OS X 16
2.3.3 Software for Linux 16

3 Configuration 18
3.1 The devolo Informer 18
3.2 Accessing the integrated configuration interface 19
3.3 WLAN status 21
3.4 Change configuration 21
3.4.1 Security 22

3.4.2 Network settings 23
3.4.3 WLAN mode 24
3.4.4 WLAN settings 26
3.4.5 WLAN filters 28
3.4.6 dLAN Settings 30
3.5 Management 31
3.5.1 Reset configuration 31
3.5.2 Save and load configuration 32
3.5.3 Update firmware 33

4 Establishing a connection to the dLAN® network 35
4.1 Basics 35
4.2 Setting up a dLAN® network 35
4.2.1 Step 1: Search for dLAN adapter 36
4.2.2 Step 2: Enter a network password 37
4.2.3 Step 3: Add dLAN adapters 38
4.3 Security in the dLAN® 39

5 Setting up a WLAN network 41
5.1 Basics 41
5.2 Radio network configuration 41
5.2.1 WLAN access point operation 41
5.2.2 WLAN client operation 44
5.3 Security in the WLAN 46

6 Appendix 48
6.1 Technical data 48
6.2 Declarations of conformity 51
6.3 Warranty conditions 53

1 Introduction

Intelligent and secure technologies such as dLAN® (networking via the household power grid) and WLAN (wireless networking) have made setting up a home network fast, easy and economical, while making the installation of expensive, dedicated wiring superfluous. The available performance and effort required for the installation also compares favorably to traditional methods – dLAN® and WLAN technology now attain speeds you would expect from a conventional LAN, and installing it is a breeze!

1.1 What exactly is dLAN®?

dLAN® (direct LAN) uses the household power grid to transfer data between computers equipped with suitable adapters and other network components. As a result, any power outlet can be used as a network access point.

The data is modulated prior to transfer and sent as a signal via household power lines. State-of-the-art technology ensures that the power and data networks do not interfere with one another. Networking via dLAN® is fast and secure. The data is automatically encrypted using a key to prevent easy interception by third parties.

1.2 What is WLAN?

WLAN (Wireless Local Area Network) refers to the use of radio technology to network computers and other devices. While it is possible to wirelessly connect computers in pairs (peer-to-peer, p2p), a central access point is required to set up a network of multiple devices. Such access points are frequently combined in a single device with modems for Internet access and routers to manage network traffic.

The wireless network established by an access point using a specific channel (from 1 to 13) and name (SSID) has a limited range. The range of the access point, which is also known as a "radio cell", is impeded by building walls. In some cases, stable connections are often only possible between WLAN devices within a single room.

As it is not possible to rely on hardware such as network cables (in a LAN) or household wiring (in a dLAN®) to control access to a WLAN, wireless networking naturally presents special security challenges. WLANs therefore use a number of security measures, such as a concealed network name, data encryption and access control via the MAC addresses of the network adapters.

1.3 What the dLAN® Wireless extender has to offer

The devolo dLAN® Wireless extender lets you quickly and simply interconnect WLAN, dLAN® and LAN networks:

As a WLAN access point, the adapter lets your WLAN devices communicate with an existing LAN or dLAN® network. In this way, you can extend your wireless network to rooms that were previously out of range.

Thanks to its integrated LAN port, the Wireless extender can also be used as a WLAN adapter for a single network device.

As a HomePlug adapter, the Wireless extender can connect a single device such as a computer or printer to the dLAN® via an electrical outlet.

Alternatively, the Wireless extender can be configured as a WLAN client to connect your home network to an Internet access point outside of your home.

The combination of LAN, dLAN® and WLAN standards make you completely independent of existing network sockets. Instead, you can connect your devices using power outlets, LAN or wirelessly with complete freedom. You can extend or reconfigure your network at any time by simply plugging in your dLAN® Wireless extender in a different location, for example when working in another room.

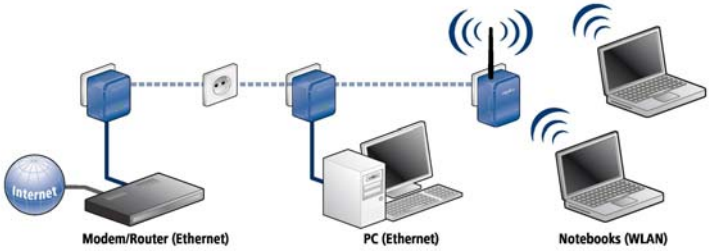
1.4 Sample applications

While it would be feasible to use the Wireless extender as a simple dLAN® or WLAN adapter in combination with a variety of other network components, devolo® markets other devices such as the dLAN® 200 AV or the WLAN USB Stick which are better suited for such applications. The dLAN® Wireless extender comes into its own when interconnecting dLAN® and WLAN networks:

1.4.1 dLAN® Wireless extender as an access point

By default, the dLAN® Wireless extender is set up to serve as a WLAN access point for a dLAN® network connected via a power outlet, thus providing access to other client devices such as laptops, desktop PCs and printers.

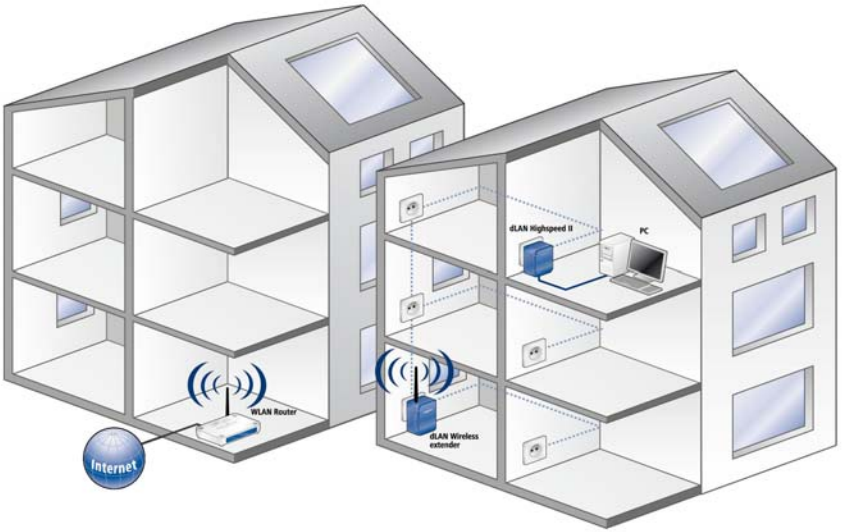
This is especially practical if not all client stations are within range of the WLAN base station, for example if thick concrete walls are obstructing the signal. With dLAN®, rooms can easily be connected via the power grid. A dLAN® Wireless extender lets you quickly and easily turn any wall outlet into a WLAN access point with excellent reception quality.



The illustration shows how two mobile notebooks can connect to the Internet and to other PCs in the dLAN® home network via the Wireless extender.

1.4.2 dLAN® Wireless extender as a client

Alternatively, the dLAN® Wireless extender can be configured as a WLAN client (see sections 3.4.3 and 5.2.1). In this case, the adapter establishes a connection between an existing WLAN and the devices in the dLAN® network. This is especially practical if network access is otherwise not possible via dLAN® nor by an Ethernet cable (when using a public access point to access the Internet, for example).



The illustration shows how the Wireless extender connects computers in the dLAN® wirelessly to an existing router in another building, which in turn provides Internet access via Ethernet.

2 Initial use

This chapter covers the hardware and software features of the dLAN® Wireless extender, as well as its installation and initial use.

2.1 Displays and connections

2.1.1 LEDs

The current status of the dLAN® Wireless extender is shown by four LEDs on the housing.

Operation: lit continuously when the adapter is connected to the power grid.

dLAN®: lit continuously when a connection exists to other HomePlug adapters; flashes when data is being sent or received via dLAN®.

WLAN: lit continuously when a WLAN exists; flashes when data is being sent or received.

LAN connection: lit continuously when a connection with the Ethernet exists; flashes when data is being sent or received in the LAN.

2.1.2 Ports

The dLAN® Wireless extender is easy to use. The device has very few ports:

The AC plug connects the adapter to your power outlet.

The WLAN antenna provides the connection to other wireless network devices. It can be set at an angle of up to 90° in order to optimize wireless communications to the adapter's location.

The Ethernet LAN port can be used to connect a single PC or other network device using a standard RJ45 patch cable.

2.2 Connecting the dLAN® Wireless extender

To connect the dLAN® Wireless extender, simply plug it into a free power outlet at the desired installation location. Ensure that the adapter is fully inserted in the outlet.

If possible, do not plug the adapter into a power strip. This may impair the transmission of the dLAN® signals. A free wall outlet is preferable. To monitor the speed of the dLAN®, use the devolo Informer (see section 3.1). If only low (i.e. single-digit) speeds are reached, then the connection to the power grid is possibly not optimal.

You may then also connect a single computer or other network device with an Ethernet LAN port directly to the dLAN® Wireless extender with a standard RJ45 Ethernet patch cable. This lets you connect devices (generally desktop PCs) without WLAN adapters to your home network.

2.3 Software installation

The Software folder of your dLAN® Wireless extender CD-ROM contains applications and tools for the Microsoft® Windows®, Mac OS X and Linux operating systems.

The Acrobat folder contains the *Acrobat Reader, which is required for reading PDF files.*

2.3.1 Software for Windows®

Use the installer in the Software ▶ dLAN folder to set up five software components for using the adapter with the Windows® operating system:

The devolo dLAN Wireless extender configuration program opens the integrated configuration interface in a web browser.

The devolo dLAN Configuration Wizard integrates the Wireless extender in a dLAN® network.

devolo Informer finds dLAN® adapters in a HomePlug network and displays information on the devices found.

To install the software, insert the included CD-ROM in the CD drive of your computer. If autoplay is installed on your computer, the installation will start automatically. Otherwise, open the folder with the Windows Explorer by right-clicking on Start and selecting Explorer from the context menu. Double-click to start the installer manually.

During the installation process, you will be given the choice of installing all software components (Standard) or selecting individual ones (Custom).

We recommend a complete installation of all applications, or as a minimum the devolo dLAN Configuration Wizard *and* devolo Informer*. The devolo® software does not continuously take up resources of your Windows operating system.*

When installation is complete, you will be given the option of launching the configuration interface of the dLAN® Wireless extender immediately. You will also be asked for permission to transfer anonymous performance data related to your dLAN® adapter to devolo®. The data sent to devolo® is solely related to the performance values of your dLAN® devices. The data is anonymized and will be used exclusively for statistical purposes. By providing this data, you can help us improve our products. You can find the installed software applications in the Start ▶ Programs ▶ devolo program group.

2.3.2 Software for Mac OS X

The Software ▶ Mac folder contains the following applications:

The dLAN Wizard lets you link different HomePlug adapters into your own dLAN® network.

The dLAN wireless extender configuration application starts the integrated configuration interface of your Wireless extender.

The functionality of these two programs corresponds to the similar applications described in this manual for the Windows® operating system.

2.3.3 Software for Linux

The Software ▶ Linux contains the appropriate software components for the Linux® operating system.

The dLAN Linux Package contains all of the components that you need to set up a dLAN® network.

dLAN wireless extender linux lets you call up the configuration of the adapter.

3 Configuration

The dLAN® Wireless extender consists of three separate, integrated network components.

The dLAN® adapter connects the device to the dLAN® network via a power outlet.

The WLAN station can either establish a connection to an existing wireless network or serve as an access point.

Computers can also be connected directly to the Ethernet port of the Wireless extender as an alternative to the WLAN or in addition to it.

The dLAN® Wireless extender features an integrated configuration interface that can be accessed using a standard web browser. Most of the adapter's settings can be configured with it. The only exception is the initial integration of the Wireless extender into an existing dLAN® network, which should be performed using the dLAN Configuration Wizard (see section 4.2).

3.1 The devolo Informer

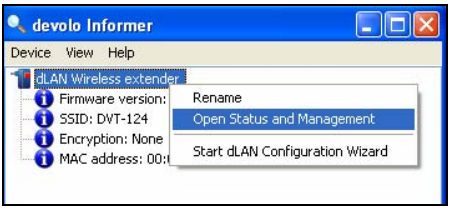
devolo Informer can detect all available dLAN® adapters in your home network and display device information in an overview. After installing the devolo® software (see section 2.3), it can be found in the Start ▶ Programs ▶ devolo program group.

When the Informer is launched, it initially scans your home network for all available dLAN® devices. This may take a moment. All found adapters are listed with their names and MAC addresses in the overview window. The transmission speed of active dLAN® connections between adapters is also displayed.

devolo Informer generally updates the list of found dLAN® devices automatically. If newly-added adapters do not appear in the window, refresh the display with F5 or via the View menu.

devolo Informer can use special access techniques to find the dLAN® Wireless extender in your network in cases in which you cannot access it using a web browser or configuration program (i.e. when you do not know its IP address). Ensure that you always have the Informer handy for such cases.

Use the Device menu or the context menu that opens with a right-click on the name of the displayed dLAN® device to rename the adapter or launch either of the configuration options (Start dLAN Configuration Wizard and online configuration interface via Open Status and Management).



Multiple instances of devolo Informer installed in your network can be set to exchange information about found dLAN® adapters under View ▶ Options…. You may also specify whether information on the performance of your dLAN® adapters will be transferred to devolo® here. The data sent to devolo® pertains only to the performance values of your dLAN® devices. The data is anonymized and will be used exclusively for statistical purposes. By providing it, you can help us improve our products.

3.2 Accessing the integrated configuration interface

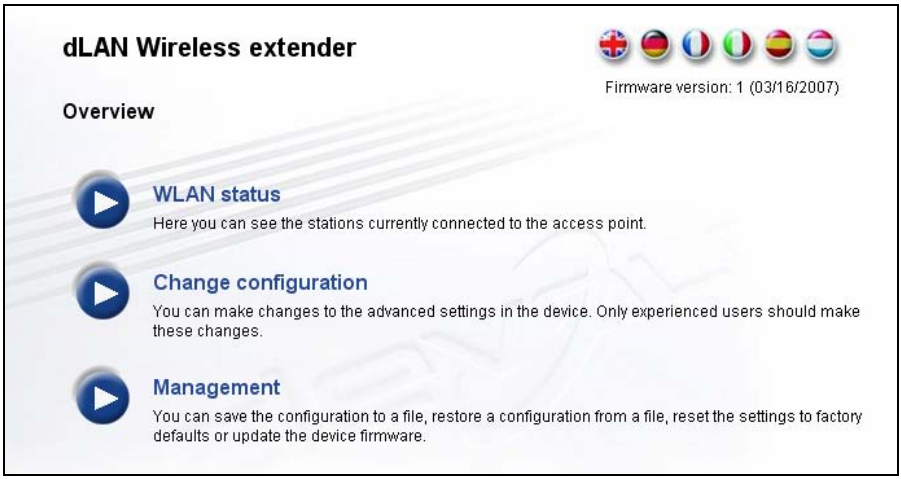
The integrated online configuration interface of the dLAN® Wireless extender can be accessed in three different ways:

In most cases, the devolo® dLAN Wireless extender Configuration application (Start ▶ Programs ▶ devolo ▶ dLAN Wireless extender Configuration) will find the device automatically and open its configuration interface in a web browser window.

If this method is not successful, launch the devolo Informer utility (Start ▶ Programs ▶ devolo ▶ devolo Informer). Right-click the name of the wireless Extender and select the Status and Management menu item. The program determines the correct IP address and launches the configuration in your web browser.

If you know the exact IP address of your adapter, you may also enter it directly in the address line of a web browser such as Microsoft Internet Explorer or Firefox (e.g. 192.168.0.17).

By default, the configuration interface will open directly. If a log-in password was set under Overview ▶ Edit Configuration ▶ Security, you will be prompted for it before the configuration interface will open.


dLAN Wireless extender
Firmware version: 1 (03/16/2007)
Overview
WLAN status
Here you can see the stations currently connected to the access point.
Change configuration
You can make changes to the advanced settings in the device. Only experienced users should make these changes.
Management
You can save the configuration to a file, restore a configuration from a file, reset the settings to factory defaults or update the device firmware.

Three central sections will be displayed when the configuration interface opens:

WLAN Status provides general information about your wireless network and other stations connected to your Wireless extender where available.

Change Configuration lets you adjust a variety of your adapter's settings.

The Management section lets you back up, restore and reset your user-specific configuration. You can also update the firmware of your dLAN® Wireless extender here.

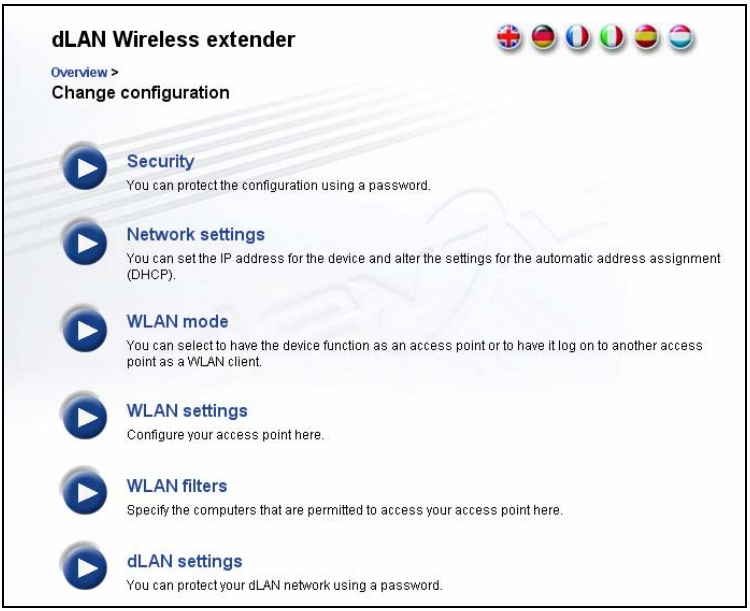
3.3 WLAN status

WLAN status provides a concise overview of the current status of your dLAN® Wireless extender. WLAN Connection displays the current status of your wireless network, consisting of the name (SSID) and the selected encryption, if applicable.

Connected Stations displays the network addresses of all wireless devices currently connected to your Wireless extender. These so-called MAC addresses consist of six two-digit hexadecimal numbers separated by colons.

3.4 Change configuration

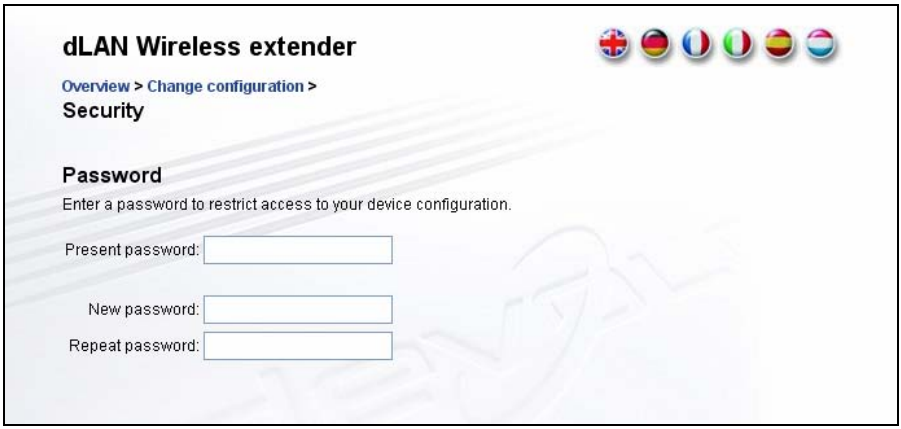
The configuration area lets you adjust settings related to security, the network in general, wireless networking and dLAN® to suit your requirements.


dLAN Wireless extender
Overview >
Change configuration
Security
You can protect the configuration using a password.
Network settings
You can set the IP address for the device and alter the settings for the automatic address assignment (DHCP).
WLAN mode
You can select to have the device function as an access point or to have it log on to another access point as a WLAN client.
WLAN settings
Configure your access point here.
WLAN filters
Specify the computers that are permitted to access your access point here.
dLAN settings
You can protect your dLAN network using a password.

3.4.1 Security

This area lets you specify or modify a log-in password for access to the configuration interface of the dLAN® Wireless extender. Enter the current password (if assigned), then enter the new password twice.

By default, the integrated configuration interface of the dLAN® Wireless extender is not password-protected. However, we recommend assigning a password when the installation of the adapter is complete to protect it against tampering by third parties.



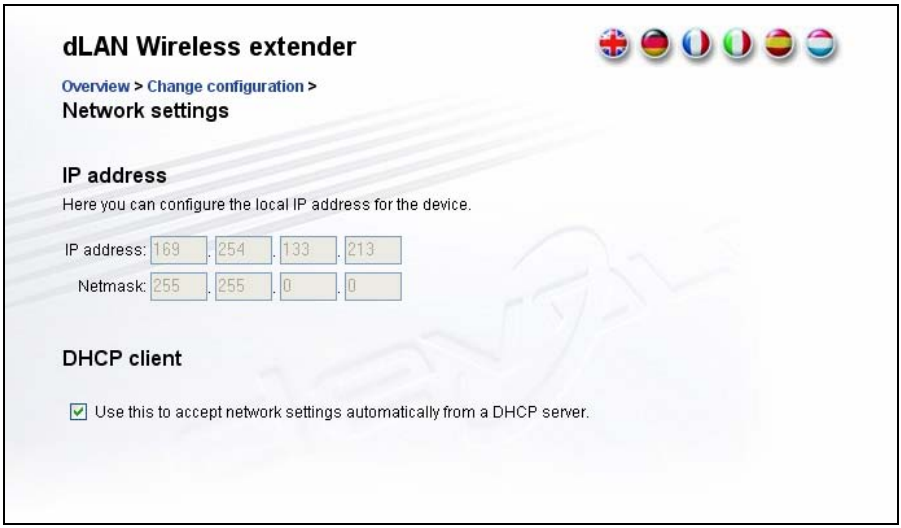
3.4.2 Network settings

As a component of your home network, the dLAN® Wireless extender communicates using the TCP/IP protocol. The IP address required for this purpose can either be entered manually as a static address or assigned by a DHCP server.

To specify an address, first disable the option Use this to accept network settings automatically from a DHCP Server. Enter the IP address and the netmask and click Save.

You can leave this option enabled if you already have a DHCP server assigning the IP addresses in your network and you would like the Wireless extender to automatically receive its IP address. The advantage in this is that you will not have to manually reconfigure your Wireless extender whenever you make changes in the address space of your home network.

Once your Wireless extender has successfully obtained an IP address via DHCP, the address will appear with a gray background under IP Address*.*


dLAN Wireless extender
Overview > Change configuration >
Network settings
IP address
Here you can configure the local IP address for the device.
IP address: 169 . 254 . 133 . 213
Netmask: 255 . 255 . 0 . 0
DHCP client
Use this to accept network settings automatically from a DHCP server.

*Should you ever forget the IP address of your dLAN® Wireless extender, use the devolo Informer (*Start ▶ Programs ▶ devolo ▶ devolo Informer*) to find the adapter in your network. Right-click on the name of the adapter in the overview of the Informer and select the* Status and Management *context menu item to open the configuration interface in your web browser. The current IP address of the Wireless extender will then be displayed in the address field of the browser.*

3.4.3 WLAN mode

The dLAN® Wireless extender can be used in two basic WLAN modes:

As an access point: in this mode, the Wireless extender provides access to the dLAN® network to other WLAN clients via its own wireless network.

As a WLAN client: in this mode, the Wireless extender connects your dLAN® to the wireless network of an existing access point or WLAN router.

dLAN Wireless extender
Overview > Change configuration >
WLAN mode
WLAN mode
You can select to have the device function as an access point or to have it log on to another access point as a WLAN client.
Access Point
WLAN client
SSID:
WEP key:
Enter the WEP key as a 10-digit (for 64-bit encryption) or a 26-digit (for 128-bit encryption) hexadecimal number. Hexadecimal numbers can contain the numbers 0-9 and the letters A-F.

In Overview ▶ Change Configuration ▶ WLAN mode, specify the operating mode of your dLAN® Wireless extender. To use your adapter as an access point, you will need to configure additional settings related to the SSID, channel and encryption (see following section). To use your Wireless extender as a WLAN client in an existing wireless network, enter the network's name (SSID: Service Set Identifier) and WEP key (if applicable).

A WEP key consists of a hexadecimal number with exactly 10 or exactly 26 digits (from 0 to 9 and A to F, e.g. "8AF34597FF"). Do not enter special characters such as colons.

Note that the WLAN function is enabled and WLAN encryption is disabled when the device is set to its factory defaults. When enabling encryption, ensure that the WLAN settings (SSID, encryption mode and encryption password) of the access point and those of the clients always match, as otherwise you may exclude devices from your network (unintentionally).

Click **Save** when you are finished.

3.4.4 WLAN settings

To use your dLAN® Wireless extender as an access point (see previous section 3.4.3), you must configure a number of parameters for your wireless network. The basic wireless settings and encryption methods can be configured under Overview ▶ Change Configuration ▶ WLAN Settings.

When using your Wireless extender as a WLAN client, all of the options on this page are irrelevant. A message informing you of the current status will be displayed if that is the case.

It is also possible to completely disable the WLAN capabilities of your Wireless extender, for example when using it as a simple dLAN® adapter via its integrated Ethernet port. Simply disable the Activate WLAN option.

Please note that your existing wireless connection to the Wireless extender will be reset when saving these settings. In this case, configure the device via Ethernet or dLAN®.

When using the device as an access point, you must specify a channel. 13 channels are available. Channel 6 is selected by default.

Contrary to popular belief, it is not a problem if multiple access points share a channel. It can even be advantageous to maintain a channel spacing of five numbers from other access points. You should therefore favor channels 1, 6 and 11.

The SSID specifies the name of your wireless network. Others can see this designation when logging on to the WLAN to identify the correct subnet. Your wireless network will remain invisible if you activate the Hide SSID option. In that case, potential network users must know the exact SSID and enter it manually to establish a connection.

dLAN Wireless extender
Overview > Change configuration >
WLAN settings
Settings
Please select the settings to be used by your access point.
Activate WLAN
Channel: 11
SSID: Wlan
Hide SSID
Security
You may encrypt the data traffic of your wireless network to prevent unauthorized access to your data.
No encryption
WEP
Enter the WEP key as a 10-digit (for 64-bit encryption) or a 26-digit (for 128-bit encryption) hexadecimal number. Hexadecimal numbers can contain the numbers 0-9 and the letters A-F.
Key:
WPA / WPA2
Please enter the WPA key as a string of characters. All letters and digits are valid characters.
Key:
Only permit WPA2 (maximum security)

A number of WLAN adapters have difficulties connecting to such invisible wireless networks. If you have problems connecting to a network with a hidden SSID, start by establishing a connection with the SSID visible, then hide the SSID.

If you do not use encryption, not only will all data being transferred from client computers to the Wireless extender in your wireless LAN be unprotected, users will not be prompted for a password when establishing a connection. If you have not set up any other security measures such as WLAN filters (see section 3.4.5), third parties will be able to access your network at

any time and use your Internet connection. Under normal circumstances, you will not notice that this is occurring.

*Note that the **WLAN function** is **enabled** and **WLAN encryption** is **disabled** when the device is set to its **factory defaults**.*

Two standards are available for ensuring secure data communications in wireless networks. The older and somewhat weaker WEP standard protects communications using keys consisting of 10 or 26 digits. Simply enter a sequence of the proper number of hexadecimal characters in the Key field.

The more modern WPA/WPA2 (WiFi Protected Access) supports individual keys consisting of letters and digits with a length of up to 63 characters. These can be simply entered using the keyboard without prior conversion into hexadecimal format, as is the case with WEP. Client access to the Wireless extender can also be restricted to the highly secure WPA2 method by enabling the "Only permit WPA2 (maximum security)" option.

Be sure to save your changes before leaving the configuration area.

We recommend always encrypting your WLAN connections. Without it, anyone within range can intrude on your home network and use your Internet connection without your authorization. Wherever possible, always choose the stronger WPA/WPA2 encryption method. Do not use the WEP standard unless your wireless devices do not support a higher standard.

3.4.5 WLAN filters

In addition to encryption (see previous section), setting up a WLAN filter can further restrict access to your Wireless extender to selected devices. Even if encryption were disabled, other adapters would not be able to establish a connection.

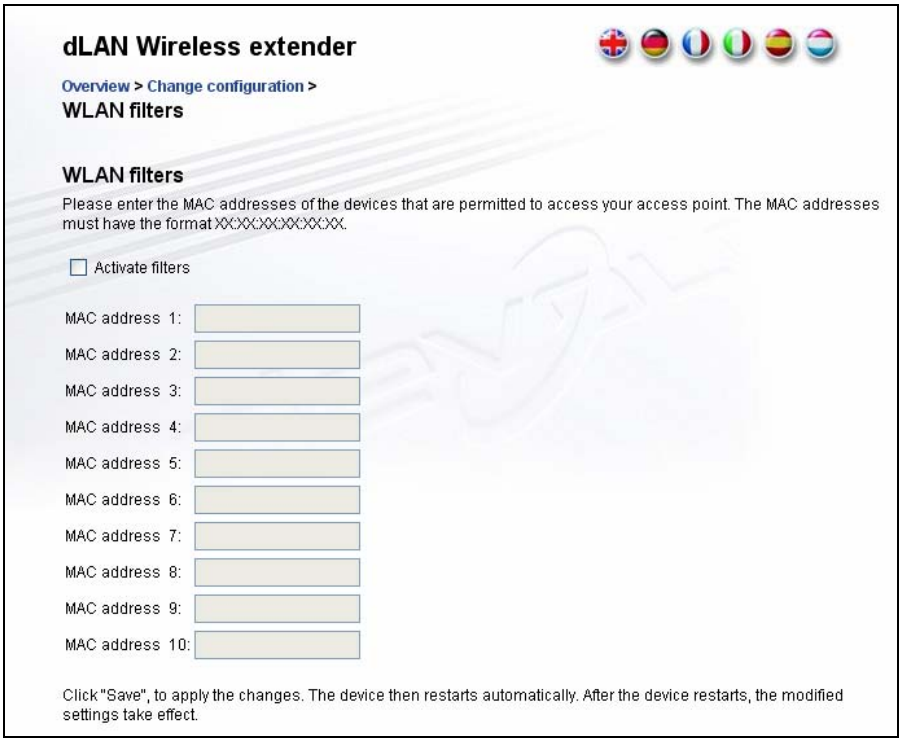
The WLAN filter should only be used as an additional option. It is useful for restricting access to your wireless network. Without encryption, however, it is still relatively easy for third parties to intercept your data communications.

To use the WLAN filter, select the Activate filters option under Overview ▶ Edit Configuration ▶ WLAN Filters (the 10 input fields underneath it will then be activated). You can now list up to ten different network devices permitted to access your dLAN® Wireless extender by entering their so-called MAC addresses.

The MAC address refers to the network adapter of a device (e.g. the WLAN card of a laptop or the Ethernet port of a printer). It consists of six two-digit hexadecimal numbers that are separated by colons (e.g. 6A:54:FA:11:DE:23). The MAC address can generally be found on a label on the network adapter.

You can easily determine the MAC address of a Windows PC by opening a command prompt window with Start ▶ Programs ▶ Accessories ▶ Command Prompt*. Enter the command* IPCONFIG /ALL*. The MAC is shown under the designation* Physical Address.

Do not forget to click **Save** after entering the MAC addresses. An error message will be returned if any of the values entered are invalid (e.g. because the colons are missing).


dLAN Wireless extender
Overview > Change configuration >
WLAN filters
WLAN filters
Please enter the MAC addresses of the devices that are permitted to access your access point. The MAC addresses must have the format XX:XX:XX:XX:XX:XX.
Activate filters
MAC address 1:
MAC address 2:
MAC address 3:
MAC address 4:
MAC address 5:
MAC address 6:
MAC address 7:
MAC address 8:
MAC address 9:
MAC address 10:
Click "Save", to apply the changes. The device then restarts automatically. After the device restarts, the modified settings take effect.

Please remember to enter the MAC address of your own computer as well if you are connected to the Wireless extender via WLAN rather than the Ethernet port. Otherwise, you will lock yourself out of the device by activating the WLAN filter!

3.4.6 dLAN Settings

In a dLAN® network, all connected components must use the same password. The dLAN® password is normally defined once during the installation of your Wireless extender with the aid of the dLAN Configuration Wizard (see section 4.2) or taken over from the existing network.

dLAN Wireless extender
Overview > Change configuration >
dLAN settings
dLAN password
Enter the dLAN network password needed for your device to access your dLAN network. All devices that are part of a dLAN network must use the same dLAN network password.
Password:
Repeat password:

The password can also be entered manually under Overview ▶ Change Configuration ▶ dLAN Settings. Enter the desired password in each of the two input fields and click Save.

3.5 Management

Use the Management section to reset your current configuration to factory defaults, save the configuration as a file on your computer or restore such a file to the device, or update the firmware of the dLAN® Wireless extender.

3.5.1 Reset configuration

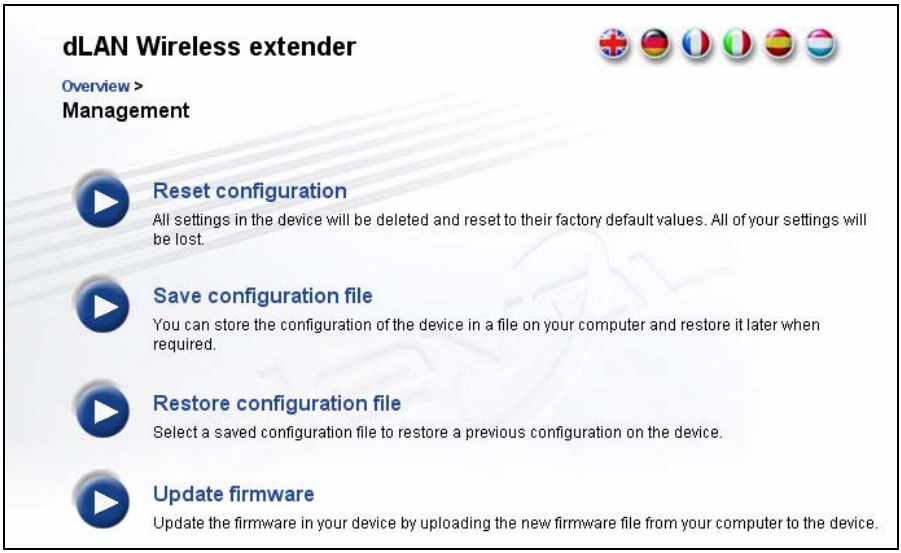
Use Overview ▶ Management ▶ Reset Configuration to reset your dLAN® Wireless extender to its factory defaults. Your personal settings will be discarded during the reset. The most recently assigned dLAN® password for the dLAN® Wireless extender adapter will be retained, however, and will not be reset to the default password "HomePlug".

You can also change the dLAN® password by using the dLAN Configuration Wizard in the Windows® Start ▶ Programs ▶ devolo program group or via the integrated configuration interface of the adapter in the Overview ▶ Change Configuration ▶ dLAN Settings section.

To restore your settings after a reset, save them in a file on your computer and reload them (see following section).

3.5.2 Save and load configuration

All active configuration settings can be backed up by transferring them to your computer and saving them in a file. This file can then be used to restore the configuration of your dLAN® Wireless extender. This function can be useful for creating a variety of configurations that will let you quickly and easily set up the adapter for use in different network environments.


dLAN Wireless extender
Overview >
Management
Reset configuration
All settings in the device will be deleted and reset to their factory default values. All of your settings will be lost.
Save configuration file
You can store the configuration of the device in a file on your computer and restore it later when required.
Restore configuration file
Select a saved configuration file to restore a previous configuration on the device.
Update firmware
Update the firmware in your device by uploading the new firmware file from your computer to the device.

To save the active configuration in a file on your computer, click the appropriate button in Overview ▶ Management ▶ Save Configuration File. Specify a name and location for the configuration file.

Use Overview ▶ Management ▶ Restore Configuration File to send an existing configuration file to the Wireless extender and activate it. Click Browse… to select a suitable file and start the process by clicking the Restore Configuration File button.

3.5.3 Update firmware

The firmware of the dLAN® Wireless extender contains the adapter's operating software. devolo® may make new versions of the firmware available as downloadable files to add functions or correct bugs.

dLAN Wireless extender
Overview > Management >
Update firmware
Current firmware version: 1 (03/16/2007)
Update firmware
Enter the path to and the name of the firmware file. You can also browse for the file in any directory.
Note that updating the firmware causes the device to be reset to the factory default settings. This will clear all settings that you have changed.
File name:
Browse...
Update firmware

Do not update your firmware unless you need a certain new function or would like to eliminate a specific bug. If you are satisfied with the function of your dLAN® Wireless extender, leave the device unchanged.

To update the firmware, visit the devolo® website at www.devolo.com and download the appropriate file for the Wireless extender to your local computer. Next, go to the configuration dialog under Overview ▶ Management ▶ Update firmware. Click **Browse…** and select the downloaded file on your hard drive. Start the update process by clicking the Update firmware button. The dLAN® Wireless extender will reboot when the update has completed successfully. All settings will be reset to factory defaults.

Ensure that the update process is not interrupted. We recommend connecting your computer to the Wireless extender via dLAN® or LAN, not WLAN.

4 Establishing a connection to the dLAN® network

4.1 Basics

Before you can use your Wireless extender in your dLAN® network, you must first establish a connection to the existing adapters in your home network. Two specific pieces of information are especially important for this:

The **dLAN® password** is not only important for accessing the HomePlug network. It also serves as an encryption key, ensuring the security of the transferred data. Using a shared dLAN® password (in combination with the exchanged security codes) defines the limits of the dLAN® network.

Each HomePlug adapter has its own **16-digit security code** (usually on a label on the underside of the device) that is its unique identifier. All dLAN® devices on the network must exchange these security codes before they can establish a connection.

Both items of information are required when setting up a dLAN® network using the dLAN Configuration Wizard.

Please note that you must configure a number of other network, security and WLAN-related settings via the integrated configuration interface to ensure the successful operation of the Wireless extender. For more information, see Chapters 3 and 5.

4.2 Setting up a dLAN® network

The **dLAN® Configuration Wizard** is designed to help you connect multiple devolo® dLAN® adapters into a self-contained, secure home network. After successfully installing the devolo® software, you can launch

the Wizard via the Start ▶ Programs ▶ devolo program group and the Device ▶ Start dLAN Configuration Wizard menu of the devolo Informer.

Before beginning with this step, make a note of the security codes of all existing dLAN® adapters. This unique identifier of each dLAN® device is located on the label on the underside of the housing. The code consists of 4 x 4 letters separated by dashes (e.g. ANJR-KMOR-KSHT-QRUV). Ensure that all dLAN® adapters are connected to the power grid and computers or other network components as appropriate.

4.2.1 Step 1: Search for dLAN adapter

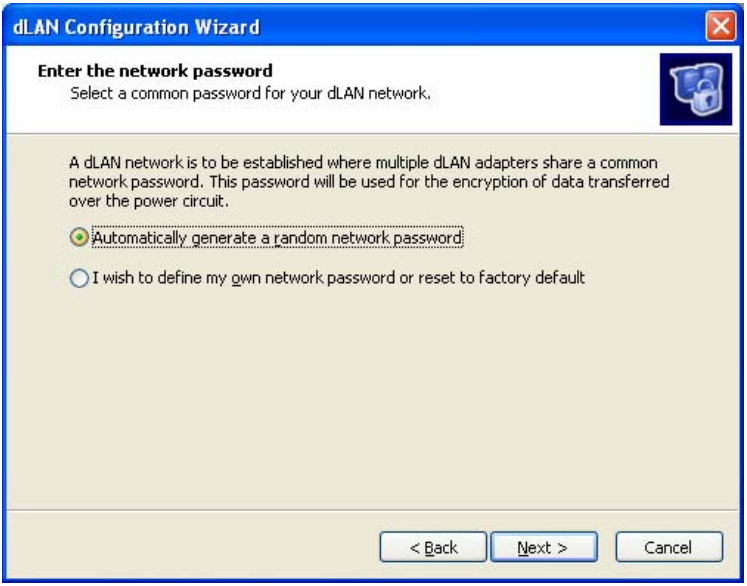
After launching the Wizard, it initially scans for a dLAN® adapter connected directly to your computer.

dLAN Configuration Wizard
Search for local dLAN adapter
The wizard is looking for a dLAN adapter that is connected to this computer.
Please wait while the wizard looks for a dLAN adapter that is directly connected to this computer.
< Back
Next >
Cancel

If it does not find a suitable device, use devolo Informer (see section 3.1) to check whether it can be recognized correctly.

4.2.2 Step 2: Enter a network password

In this step, select a network password that will apply to all adapters in your home network. The password must be used by all dLAN® devices.


dLAN Configuration Wizard
Enter the network password
Select a common password for your dLAN network.
A dLAN network is to be established where multiple dLAN adapters share a common network password. This password will be used for the encryption of data transferred over the power circuit.
Automatically generate a random network password
I wish to define my own network password or reset to factory default
< Back
Next >
Cancel

Automatically generate a random network password

Alternatively, the Configuration Wizard can automatically generate a password for use with your dLAN® network. This can be done without problems, as it is only needed for setting up your home network.

I wish to define my own network password or reset to factory default

You can also assign a password of your own, or restore the factory default password of your dLAN® adapter.

The factory default password is "HomePlug".

The dLAN® password of a specific dLAN® Wireless extender can also be changed via the integrated configuration interface of the adapter (also see 3.4.6). Go to Overview ▶ Change Configuration ▶ dLAN Settings. Enter the desired password twice and click Save.

dLAN Wireless extender
Overview > Change configuration >
dLAN settings
dLAN password
Enter the dLAN network password needed for your device to access your dLAN network. All devices that are part of a dLAN network must use the same dLAN network password.
Password:
Repeat password:

Assigning a specific password to a single adapter will exclude it from the remaining dLAN® network. If possible, use the dLAN Configuration Wizard to ensure that a single password is used throughout your entire dLAN® home network.

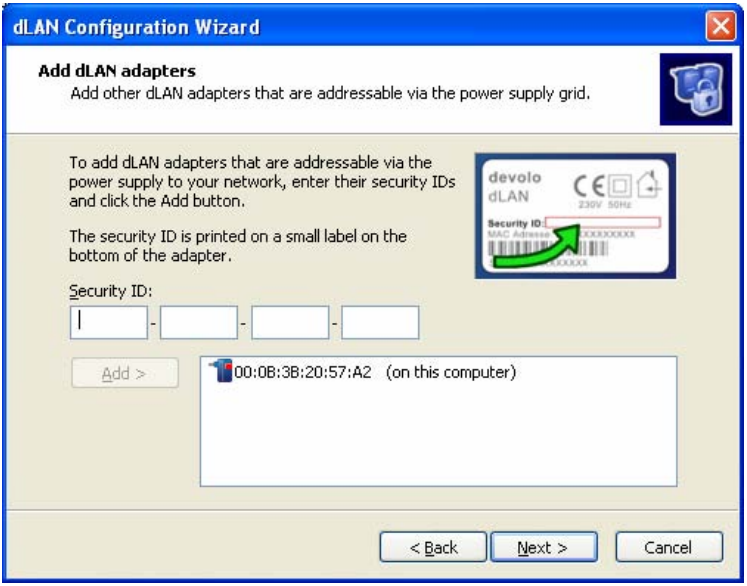
4.2.3 Step 3: Add dLAN adapters

At this point, add further dLAN® adapters to your home network. You will need the 16-character security codes from the labels on the bottom of the adapter housings. Enter the code without hyphens in the Security ID field and click Add. If the code is correct, a small icon and the network ID of the found adapter will appear in the list.

When launching the dLAN® Configuration Wizard again after a successful initial installation – when integrating a new adapter into the network, for example – the application will remember devices and security codes entered in previous sessions. It will therefore not be necessary to enter them again. The Configuration Wizard will display an error message if an adapter entered

previously is not found. In that case, check whether the HomePlug device is connected to the power grid and is available.

Once you have entered the security IDs of your dLAN® adapters, your HomePlug network is complete. All computers and other network devices connected to the adapters by cable should now be able to communicate with one another in the network. If desired, continue with the configuration of the WLAN component of the dLAN® Wireless extender (see chapter 5).


dLAN Configuration Wizard
Add dLAN adapters
Add other dLAN adapters that are addressable via the power supply grid.
To add dLAN adapters that are addressable via the power supply to your network, enter their security IDs and click the Add button.
The security ID is printed on a small label on the bottom of the adapter.
devolo
dLAN
Security ID:
Security ID:
Add >
00:0B:3B:20:57:A2 (on this computer)
< Back
Next >
Cancel

4.3 Security in the dLAN®

A number of mechanisms protect data communication via the power grid to guard your privacy in your dLAN®:

A password must be assigned to all of your dLAN® devices to ensure that only your own dLAN® adapters can participate in your home

network. The password is used as an encryption key for network communication.

In addition, only those adapters that have had their security IDs registered in the dLAN Configuration Wizard are permitted access to specific dLAN® devices.

Finally, you are also partly protected against intruders by the limits of your own household power grid. Please note, however, that the grid may extend as far as the building distributor box in the case of apartment buildings.

5 Setting up a WLAN network

5.1 Basics

The dLAN® Wireless extender creates a bridge between dLAN® and WLAN networks. The adapter can be used in two operating modes for this purpose:

By default, the Wireless extender is configured to act as a WLAN access point, sending and receiving data from a dLAN® to computers and other network devices via a wireless connection.

As a WLAN client, it can log onto an existing wireless network and transfer data to a dLAN®, or optionally to a connected computer or other network device via the Ethernet LAN port.

In both modes, the connection between the dLAN® Wireless extender and other network devices can be pictured as a "wireless cable", i.e. anything that could normally be transferred via a LAN cable can also be transferred via the WLAN. The dLAN® Wireless extender supports communication speeds of up to 54 Mbps.

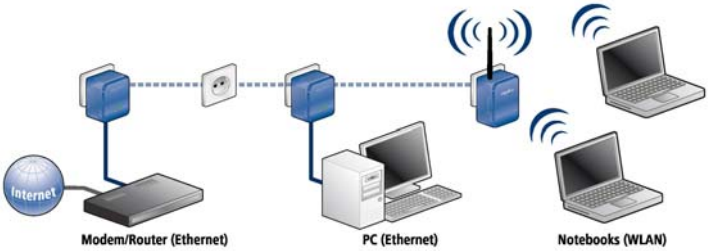
5.2 Radio network configuration

5.2.1 WLAN access point operation

In WLAN access point mode, the Wireless extender acts as an independent communication station for data from the dLAN®. Other network devices such as laptops, printers or IP telephones can establish wireless connections to the adapter in order to access the dLAN® network.

A number of settings must be adjusted in the integrated configuration interface of the dLAN® Wireless extender in order to use it as an access point. At a minimum, the WLAN mode, the name of the network (SSID) and the send channel must be stated. The method by which the adapter obtains its own IP address can be specified optionally. Although it is not

absolutely essential to the operation of the wireless network, we nevertheless urgently recommend using the various security measures provided by the Wireless extender to prevent intruders from accessing the network.



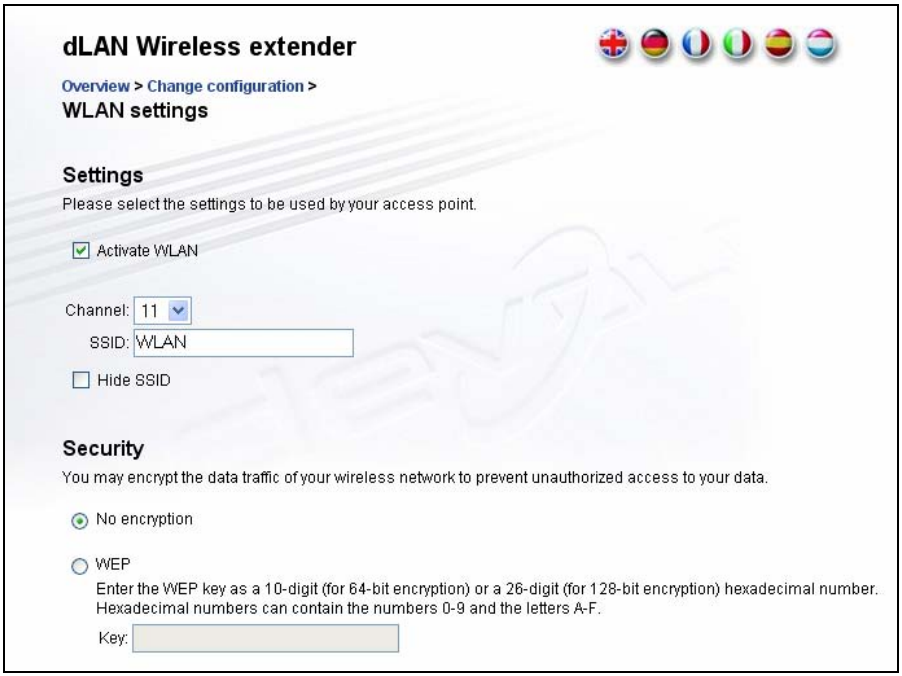
To set up the dLAN® Wireless extender for operation as a WLAN access point, open the adapter's integrated configuration interface in a window of your web browser. If you know the IP address of the device, type it into the address line of your browser. Otherwise, launch the dLAN Wireless extender configuration application, or open the configuration from the context menu of the appropriate entry in the devolo Informer.

Start in Overview ▶ Change Configuration ▶ WLAN mode. Ensure that Access Point mode is enabled.

Do not confuse the input of the SSID and WEP key under the WLAN client item with comparable entries in the WLAN settings (that apply to operation as an access point).

Go to Overview ▶ Change Configuration ▶ WLAN settings. Ensure that WLAN operation is activated. Select one of the available 13 channels for your wireless network.

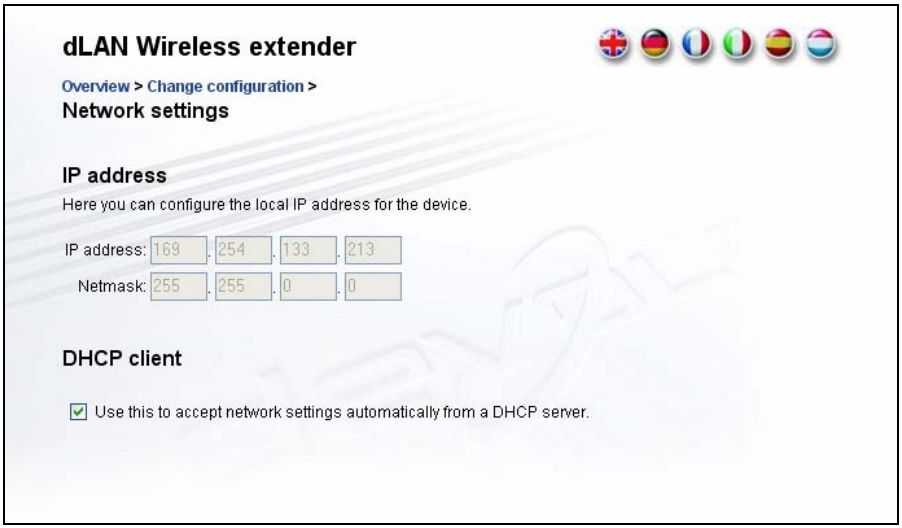
Contrary to popular belief, it is not a problem if multiple access points share a channel. It can even be advantageous to choose a channel that is spaced four numbers away from those of other access points within range. You should therefore favor channels 1, 6 and 11.


dLAN Wireless extender
Overview > Change configuration >
WLAN settings
Settings
Please select the settings to be used by your access point.
Activate WLAN
Channel: 11
SSID: WLAN
Hide SSID
Security
You may encrypt the data traffic of your wireless network to prevent unauthorized access to your data.
No encryption
WEP
Enter the WEP key as a 10-digit (for 64-bit encryption) or a 26-digit (for 128-bit encryption) hexadecimal number.
Hexadecimal numbers can contain the numbers 0-9 and the letters A-F.
Key:

Assign a unique name (SSID) to your WLAN to identify it to your clients. Optionally, you can also hide the SSID. A hidden SSID is an additional security factor, as only those WLAN clients that know the exact name of the network can access it.

A number of WLAN adapters have difficulties connecting to such invisible wireless networks. If you have problems connecting to a network with a hidden SSID, start by establishing a connection with the SSID visible, then hide the SSID.

Under Overview ▶ Change Configuration ▶ Network settings you can choose how your dLAN® Wireless extender will receive its IP address. By default, the adapter is configured as a DHCP client, i.e. it obtains its IP address automatically from a DHCP server in the network. Alternatively, you can disable this option and specify an exact IP address and netmask.


dLAN Wireless extender
Overview > Change configuration >
Network settings
IP address
Here you can configure the local IP address for the device.
IP address: 169 . 254 . 133 . 213
Netmask: 255 . 255 . 0 . 0
DHCP client
Use this to accept network settings automatically from a DHCP server.

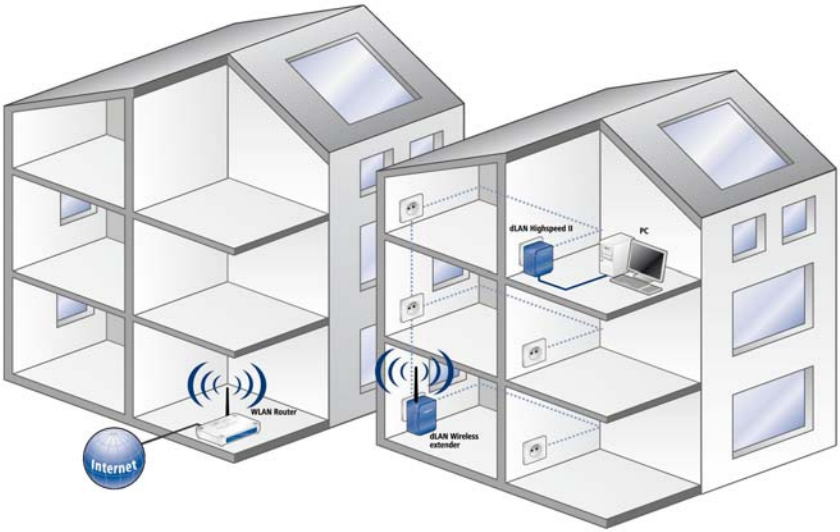
While assigning static IP addresses to the devices in your home network and entering the addresses manually can have advantages, a change to the subnet mask may result in the configuration interface of your Wireless extender becoming inaccessible. We therefore recommend retaining the default setting as a DHCP client. If you would like to configure the adapter by entering its IP address directly in the address line of your browser, you can determine its IP number by selecting Start ▶ Programs ▶ devolo ▶ dLAN Wireless extender configuration*, or by right-clicking the name of the adapter in* devolo Informer *and selecting the* Status and Management *menu item.*

We also urgently recommend securing your wireless network against intruders. For more information, read the following section.

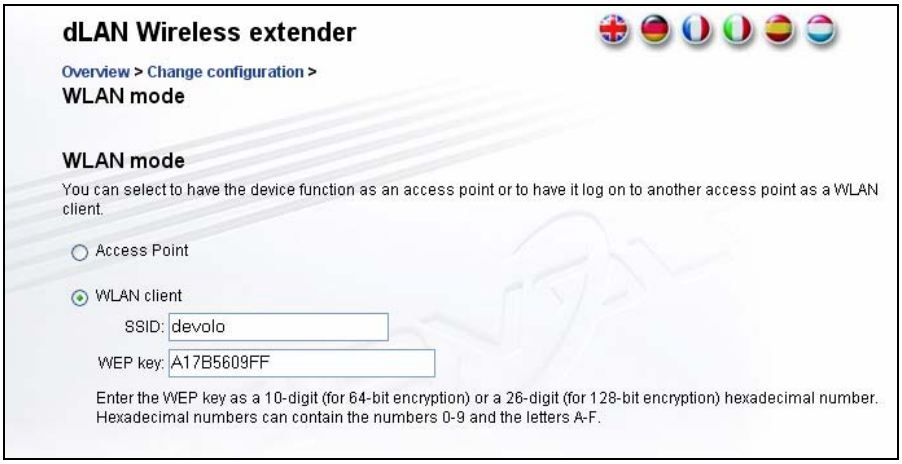
5.2.2 WLAN client operation

Very few configuration steps are needed to connect your dLAN® Wireless extender to an existing wireless network as a WLAN client. If you know the IP address of the device, type it into the address line of your browser.

Otherwise, launch the dLAN Wireless extender configuration application, or open the configuration from the context menu of the appropriate entry in the devolo Informer. Go to Overview ▶ Change Configuration ▶ WLAN mode.



Select WLAN client mode in this dialog box. Enter the SSID (name of the wireless network) and, if available, the WEP key for the WLAN which you want to access with the Wireless extender. Enter the WEP key as a 10-digit or 26-digit hexadecimal number.


dLAN Wireless extender
Overview > Change configuration >
WLAN mode
WLAN mode
You can select to have the device function as an access point or to have it log on to another access point as a WLAN client.
Access Point
WLAN client
SSID: devolo
WEP key: A17B5609FF
Enter the WEP key as a 10-digit (for 64-bit encryption) or a 26-digit (for 128-bit encryption) hexadecimal number. Hexadecimal numbers can contain the numbers 0-9 and the letters A-F.

Save your settings. The dLAN® Wireless extender will now reboot. This may take a moment. The adapter will now serve as a WLAN client in the specified wireless network for its dLAN®.

Ensure that the client connection of the Wireless extender is accepted by the existing access point. Additional settings may be required here. Should you need the MAC address of the Wireless extender for WLAN access, it can be found on the label on the underside of the housing.

If you were previously using a wireless connection to configure the dLAN® Wireless extender, the connection will naturally be lost when switching the WLAN mode. Use the LAN or dLAN® to access and configure the adapter in this case.

5.3 Security in the WLAN

When operating a wireless LAN, special measures are essential to secure the network. Theoretically, anyone with a WLAN adapter within range of your access point could break into your network unnoticed and access your computers and network devices or access the Internet via your account.

The dLAN® Wireless extender features a number of security mechanisms that can be used individually or in combination to prevent this.

By selecting a hidden network name (SSID), you can restrict access to those WLAN clients that know its exact designation. Chapter 3.4.4 of this manual covers this function in detail.

A number of WLAN adapters have difficulties connecting to such invisible wireless networks. If you have problems connecting to a network with a hidden SSID, start by establishing a connection with the SSID visible, then hide the SSID.

Encryption of your wireless data traffic with WEP – or better yet with WPA/WPA2 – not only helps restrict access to your WLAN, but also prevents "eavesdropping". For more information on encryption options, please see 3.4.4.

Ensure that all of your WLAN clients support the selected encryption standard. If in doubt, select WEP as the "lowest common denominator".

Finally, you can use the WLAN filters to configure the dLAN® Wireless extender to connect only to specified devices using their MAC addresses as identifiers. Also see 3.4.5.

6 Appendix

6.1 Technical data

	dLAN Wireless extender
Standards	Wireless specification IEEE 802.11b,g HomePlug standard 1.0 Turbo Ethernet standard IEEE 802.3/x/u, Auto MDI /MDI-X
Protocols	CSMA/CD
Transmission speed	Up to 85 Mbps over the power supply grid Up to 54 Mbps wireless range
Encoding	Asynchronous
Modulation	OFDM - 84 Carrier (Orthogonal Frequency Division Multiplexing) over the power supply grid, DSSS (Direct Sequence Spread Spectrum) over wireless/ OFDM (Orthogonal Frequency Division Multiplexing)
Range	200m over the power supply grid up to 300m wireless range
Security	DES_{pro} encryption over the power supply grid WEP, WPA, WPA2 over wireless
LEDs	LED's 4 LED's: Power dLAN Link/Act WLAN On/Act ETH Link/Act
LAN ports	dLAN®: EURO power plug WLAN: Coaxial connector with 2.4 GHz antenna Ethernet: RJ45
Power consumption	6.5 W

Power supply	Integrated power supply via power outlet Nominal voltage: 100-240 V AC Nominal current: 0.11 A Rated frequency: 50/60 Hz
Temperature	Storage: –25 °C to 70 °C Operation: 0 °C to 40 °C
Ambient conditions	10 - 90% humidity (non-condensing)
Operating systems	Et al Windows® XP, Windows® Vista, Linux®, Mac OS-X
Approvals	CE conformity in accordance with the technical requirements for all EU countries and Switzerland: EN 60950-1 :2001, EN 55022 :1998+A1 :2000 + A2 :2003 (Class B), EN 55024 :1998+A1 :2001+A2 :2003, EN 61000-3-2:2000, EN 61000-3-3 :1995+A1 :2001, EN 300 328 V1.6.1, EN 301 489-1 V1.4.1, EN 301 489-17 V1.2.1
Modes	Access point with WEP, WPA, WPA2 Client (Bridging mode) with WEP
Other	HTML configuration surface
Order number	01207 (DE/AT/CH/IT/FR/BE), 01209 (NL/ES), 01208 (UK)
EAN code	4250059612075 (DE/AT/CH/IT/FR/BE), 4250059612099 (NL/ES), 4250059612082 (UK)
Warranty	3 years
Service & support	Phone and e-mail support for Germany, Austria, Switzerland, France, The Netherlands, Belgium, Italy, Spain and Great Britain. Please see the included support flyer or the devolo website for telephone numbers and e-mail addresses.
Construction	Plastic wallplug housing
Dimensions	95 x 70 x 47mm (Height x Width x Depth)
Weight	203 g
Package size	78 x 230 x 183mm (Height x Width x Depth)

Accessories	Documentation: printed installation manual CD ROM: manual on PDF, configuration software for Windows® XP, Windows® Vista, Linux®, Mac OS-X

6.2 Declarations of conformity

CE

KONFORMITÄTSERKLÄRUNG

DECLARATION OF CONFORMITY

Hersteller: Manufacturer:	**devolo AG** **Sonnenweg 11** **52070 Aachen**
Produkt: Product:	**dLAN Wireless extender**
Typnummer: Type number:	**MT 2093, 2097**
Verwendungszweck: Intended purpose:	**PLC zu Wireless und Ethernet Adapter** PLC to Wireless and Ethernet Adapter
Richtlinie: Directive:	**1999/5/EG (R&TTE)** 1999/5/EC (R&TTE)

Das Produkt entspricht den grundlegenden Anforderungen und Bestimmungen der folgenden Normen und Methoden:
The product complies with the essential requirements and provisions of following standards and methods:

Sicherheitsanforderungen: Safety requirements:	**EN 60950-1:2001**
Immunitätsanforderungen: Immunity requirements:	**EN 55024:1998+A1:2001+A2:2003** **EN 301 489-17 V1.2.1 (08-2002)** **EN 301 489-1 V1.4.1 (08-2002)**
Emissionsanforderungen: Emission requirements:	**EN 55022:1998+A1:2000+A2:2003 (Class B)** **EN 300 328 V1.6.1 (11-2004)** **und Expert Opinion vom Competent Body EMV** and Expert Opinion by Competent Body EMC

Dieses Wireless-Gerät ist ein Sender bzw. Empfänger. Bei der Installation und Verwendung dieses Gerätes sollte ein Abstand von mindestens 20 cm zwischen dem Gerät und Ihrem Körper eingehalten werden.
This wireless device transmits and receives radio signals. During the installation and utilisation of this device, please ensure that there is a distance of at least 20 cm between the device and your body.

Diese Erklärung wird verantwortlich abgegeben durch:
This declaration is submitted by:

Aachen, 8. März 2007
Aachen, 8th March 2007

Heiko Harbers
Vorstandsvorsitzender
CEO

CE

KONFORMITÄTSERKLÄRUNG

DECLARATION OF CONFORMITY

Hersteller: Manufacturer:	**devolo AG** **Sonnenweg 11** **52070 Aachen**
Produkt: Product:	**devolo dLAN® Highspeed Ethernet II**
Typnummer: Type number:	**MT 2172, 2173**
Verwendungszweck: Intended purpose:	**PLC zu Ethernet Adapter** PLC to Ethernet Adapter
Richtlinie: Directive:	**EMV 2004/108/EG** EMC 2004/108/EC

Das Produkt entspricht den grundlegenden Anforderungen und Bestimmungen der folgenden Normen und Methoden:
The product complies with the essential requirements and provisions of following standards and methods:

Sicherheitsanforderungen: Safety requirements:	**EN 60950-1:2006**
Immunitätsanforderungen: Immunity requirements:	**EN 50412-2-1**
Emissionsanforderungen gestrahlt: Emission requirements radiated:	**EN 55022:2006**
Emissionsanforderungen leitungsgebunden: Emission requirements conducted:	**TCF vom Notified Body** **EMV Bericht Nr. TCF-LDN 08.09.003-PLC** TCF from Notified Body EMC report No. TCF-LDN 08.09.003-PLC
Erweiterter Überspannungsschutz: Enhanced surge protection	ITU – T K.21

Diese Erklärung wird verantwortlich abgegeben durch:
This declaration is submitted by:

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Aachen, 30th august 2008

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Vorstandsvorsitzender
CEO

6.3 Warranty conditions

The devolo AG® warranty is given to purchasers of devolo® products in addition to the warranty conditions provided by law and in accordance with the following conditions:

1 Warranty coverage

a) The warranty covers the equipment delivered and all its parts. Parts will, at devolo's® sole discretion, be replaced or repaired free of charge if, despite proven proper handling and adherence to the operating instructions, these parts became defective due to fabrication and/or material defects. Alternatively, devolo® reserves the right to replace the defective product with a comparable product with the same specifications and features. Operating manuals and any supplied software are excluded from the warranty.

b) Material and service charges shall be covered by devolo® , but not shipping and handling costs involved in transport from the buyer to the service station and/or to devolo® .

c) Replaced parts become property of devolo® .

d) devolo® is authorized to carry out technical changes (e.g. firmware updates) beyond repair and replacement of defective parts in order to bring the equipment up to the current technical state. This does not result in any additional charge for the customer. A legal claim to this service does not exist.

2 Warranty period

a) The warranty period for this devolo® product is three years. This period begins at the day of delivery from the devolo® dealer. Warranty services rendered by devolo® do not result in an extension of the warranty period nor do they initiate a new warranty period.

b) The warranty period for installed replacement parts ends with the warranty period of the device as a whole.

3 Warranty procedure

a) If defects appear during the warranty period, the warranty claims must be made immediately, at the latest within a period of 7 days.

b) In the case of any externally visible damage arising from transport (e.g. damage to the case), the person responsible for the transportation and the sender should be informed immediately. On discovery of damage which is not externally visible, the transport company and devolo are to be immediately informed in writing, at the latest within 3 days of delivery.

c) Transport to and from the location where the warranty claim is accepted and/or the repaired device is exchanged, is at the purchaser's own risk and cost.

d) Warranty claims are only valid if a copy of the original purchase receipt is returned with the device. devolo® reserves the right to require the submission of the original purchase receipt.

4 Suspension of the warranty

All warranty claims will be deemed invalid if

a) the label with the serial number has been removed from the device,

b) the device is damaged or destroyed as a result of acts of nature or by environmental influences (moisture, electric shock, dust, etc.),

c) the device was stored or operated under conditions not in compliance with the technical specifications,

d) the damage occurred due to incorrect handling, especially due to nonobservance of the system description and the operating instructions,

e) the device was opened, repaired or modified by persons not authorized by devolo® ,

f) the device shows any kind of mechanical damage,

g) the warranty claim has not been reported in accordance with 3a) or 3b).

5 Operating mistakes

If it becomes apparent that the reported malfunction of the device has been caused by unsuitable software, hardware, installation or operation, devolo® reserves the right to charge the purchaser for the resulting testing costs.

6 Additional regulations

a) The above conditions define the complete scope of devolo's® legal liability.

b) The warranty gives no entitlement to additional claims, such as any refund in full or in part. Compensation claims, regardless of the legal basis, are excluded. This does not apply if e.g. injury to persons or damage to private property are specifically covered by the product liability law, or in cases of intentional act or culpable negligence.

c) Claims for compensation of lost profits, indirect or consequential detriments, are excluded.

d) devolo® is not liable for lost data or retrieval of lost data in cases of slight and ordinary negligence.

e) In the case that the intentional or culpable negligence of devolo® employees has caused a loss of data, devolo® will be liable for those costs typical to the recovery of data where periodic security data back-ups have been made.

f) The warranty is valid only for the first purchaser and is not transferable.

g) The court of jurisdiction is located in Aachen, Germany in the case that the purchaser is a merchant. If the purchaser does not have a court of

jurisdiction in the Federal Republic of Germany or if he moves his domicile out of Germany after conclusion of the contract, devolo's® court of jurisdiction applies. This is also applicable if the purchaser's domicile is not known at the time of institution of proceedings.

h) The law of the Federal Republic of Germany is applicable. The UN commercial law does not apply to dealings between devolo® and the purchaser.

Index

Access point 8, 24, 26
Activate WLAN 26
Administration 31
Antenna 14
Channel 26
Configuration interface 19
Connected stations 21
Deactivate WLAN 26
devolo Informer 18
DHCP 23
dLAN 8
dLAN Configuration Wizard 30, 35
dLAN password 31, 35
dLAN Wireless extender
configuration 19
Encryption 21, 27, 47
Ethernet 14
Ethernet interface 18
Informer 18
Installation 15
IP address 20, 23
LAN port 14
LEDs 13
Linux 16
Load configuration 32
Log-in 22
MAC address 28
Mac OS X 16
Network address 23
Network password 37
Network settings 23
Package contents 5
Password 22
Patch cable 14
Ports 14
Radio cell 9
Radio channel 26
Radio network 9
Reset configuration 31
Restore configuration 32
RJ45 14
Save configuration 32
Security 22
Security code 35
Security in the dLAN 39
Security in the WLAN 46
Software 15
SSID 9, 21, 26, 47
Status and administration 19
Transmission speed 18
Update firmware 33
WEP 27
WEP key 25
WLAN 8, 18, 41
WLAN access point 41
WLAN antenna 14
WLAN client 24, 41, 45
WLAN filters 28, 47
WLAN mode 24, 45
WLAN settings 26
WLAN status 21
WPA 27